CHAPTER 4

Recommended Package of Improvements

4.1 RECOMMENDED IMPROVEMENTS

The future needs and deficiencies of the Hartford West corridor suggest that no single improvement will satisfy all of the Goals and Objectives defined for the study. Similarly, comments received on the Reasonable Alternative Packages (RAPs) from corridor municipalities suggest that some of the RAPs enjoy greater support than others. It was appropriate therefore to formulate a Hybrid Package of improvements that will achieve the best overall performance and support from local, regional, and state agencies. The Hybrid Package was then reviewed with PAC and TAC members and presented at public meetings. Following this process, a Recommended Package of improvements was endorsed by the participants of the study.

The Recommended Package presented in this chapter is based on the detailed analysis presented in earlier chapters and the discussions held among study participants. The Recommended Package of Transportation Improvements (Figure 4.1) would consist of elements of some of the higher performing alternatives, including:

- New Britain-Hartford Busway;
- Reconstruction of Flatbush, Prospect, Sisson and Sigourney Avenue Interchanges (Westside Access);
- Reconstruction of Routes 4, 6 and 9 Interchanges;
- Auxiliary Lanes between I-84 Exits 40 and 42;
- Improved Bus Services along I-84/Farmington Avenue;
- Support for Arterial Highways;
- Transportation Demand Management; and
- Land Use Regulation to Support Transit Friendly Design.

4.2 NEW BRITAIN-HARTFORD BUSWAY

The busway alternative along this corridor performed exceedingly well. It not only provided cost effective transit service that was attractive to new riders, but also the resultant impact on arterial roadways and the Interstate was positive. An Environmental Impact Statement (EIS) will be prepared for this project.

The nine (9) mile long New Britain - Hartford Busway would link Hartford's Union Station with Downtown New Britain. While the exclusive busway would terminate in Downtown New Britain, express bus services would continue via the freeway to Plainville at I-84 and beyond.

The right-of-way from Hartford to Newington Junction is currently owned by Amtrak, and is wide enough to accommodate busway construction and operation with no impact on passenger or freight rail operations (Figure 4.2). From Newington Junction to New Britain, the right-of-way is state owned and will accommodate a two lane busway. Intermediate station stops would be sited at eleven locations, including the Aetna corporate headquarters (employment center with over 10,000 employees), the New Park Road development area in Hartford's Charter Oak neighborhood, Central Connecticut State University (over 12,000 full-time and part-time students), and the East Main Street development area of the City of New Britain.

Busway Service Plan. The primary busway service would operate 18 hours per day, from approximately 6:00 A.M. until midnight. Most other routes (for example, feeder routes) would operate for shorter spans, generally corresponding to the span of service for similar current services. Frequent peak period service would be provided during a two hour A.M. peak and a two hour P.M. peak, with less frequent service being provided in the off-peak, which is the remainder of the day. For weekends and holidays, specific service plans were not developed. Instead, it was assumed that similar services would be provided, but less frequently and over a shorter span of service.

Busway Vehicles. The primary busway service will be operated with a mix of standard buses and 60-foot articulated buses. The capital cost of expanding the current fleet to include articulated buses and modifying the current maintenance facility to accommodate the articulated buses has been incorporated into the cost estimates prepared for the MIS. Further evaluation of fleet mix and alternate propulsion/fuel options will be done during the EIS.

Busway Routes & Services. Existing bus routes were used whenever possible to provide service to sta-

tions. However, as is also the case with the other alternatives, several new routes are proposed to expand accessibility to the rail service. Bus services were designed so that busway services would provide much of their own feeder services. In other words, rather than one set of bus services that operated exclusively within the busway, and another set of bus services that provided feeder services, most of the busway services were designed to operate beyond the guideway to provide their own feeder services.

Only two routes would operate along the entire length of the busway:

1. The Bristol Commuter Express, which would enter the busway at Crooked Street.
2. A new New Britain-Hartford Busway Express, which would operate entirely within the busway.

All other routes would begin off of the busway, and then enter it at various locations along the busway between downtown New Britain and Elmwood.

Speed Assumptions. In developing the busway services, the following speed assumptions were used:

- **Busway**
  West of East Street Station, where there are a number of grade crossings, speeds would average 25 mph. East of East Street Station, where the right-of-way is largely grade separated, speeds would average 30 mph.

- **Local Service**
  In Hartford and West Hartford, local buses would travel at an average speed of 11 mph (based on average speeds of existing routes).
  In Newington, Farmington, and New Britain, buses in local service would travel at an average speed of 15 mph (based on average speeds of existing routes in New Britain).

- **Express Service on Outer Highways**
  40 mph (applies to Bristol Commuter Express on Route 72 and Cheshire/Southington Express on I-84 south of Route 72).

As described below, most routes would provide a combination of busway and local service. Where this would be the case, the average speed for the route is a weighted average based on the speeds and distances in each of the operating environments.

Station & Bus Access Locations. Stations are critical elements in the acceptance of and success of Bus Rapid Transit (BRT) operations. Stations must display a high degree of amenity and traveler convenience. The station itself must be enclosed, all weather, and secure providing a comfortable waiting area. Rider conveniences such as coffee shops, news stands, cleaners, etc. will enhance the desirability of the transit service. Joint development with office, residential, retail, or other commercial uses will further strengthen system ridership. The final element of transit friendly design will include connectivity for pedestrians, transit riders, park & ride, bicyclists, and others using Busway services.

Twelve stations would be provided in four communities along the busway (Table 4.1).

Table 4.1

STATIONS BY MUNICIPALITIES

Hartford West MIS

Hartford	*West Hartford*	*Newington*	*New Britain*
Union Station	Oakwood/Flatbush Ave.	Willard Avenue	East Street
State Armory	Elmwood (New Britain Ave.)	Cedar Street	So. Main Street
Aetna Insurance			Downtown
Park Street			
New Park Ave.			

Source: Technical Report #3, Hartford West Major Investment Study

In addition to stations constructed on the busway, stations may also be built along routes that feed the busway. For example, a station location at Crooked Street in Plainville next to I-84 would increase ridership on an express route that would utilize the busway.

Bus routes will be able to enter and exit the busway at intermediate locations. The busway will also serve activity centers in the New Park Avenue corridor in Hartford, the Elmwood community in West Hartford, the future business center anticipated at the junction of Route 9 and Route 175 and Central Connecticut State University located in New Britain.

While final location studies will be necessary, access points could be located at:

- New Britain - Downtown (End Point)
- East Street
- Willard Avenue
- Oakwood Avenue
- New Park Avenue
- State Armory
- Union Station (End Point)

Connecting bus routes and van services will link passengers with off-line destinations at station locations. Bus terminal access in New Britain could include a direct connection to the limited-access Route 72 freeway, while in Downtown Hartford buses could leave the busway between Broad and Church Streets and circulate through the CBD to Main Street. Park-and-ride lots would offer further flexibility in meeting passenger needs.

New bus routes designed to take advantage of the busway will be able to offer Hartford residents greater access to suburban employment centers in the towns of West Hartford, Newington, New Britain, Farmington and Plainville. The flexibility of busway operation would allow the transit system to more effectively respond to changing ridership demand and future development within the corridor.

Travel Time Savings. The busway was selected as the preferred alternative for this corridor because it offers the travelers the greatest speed, flexibility and ease of interface as compared with other modal alternatives. Busway travel speed is enhanced by the exclusive use of the facility. In portions of New Britain, where there are a number of grade crossings, bus travel speeds would average 25 mph, while the exclusive grade-separated right-of-way through Newington, West Hartford and Hartford will allow buses to travel at an average of 30 mph or more. Projected travel times, average travel speed and travel time savings for busway users are shown in Table 4.2.

Both bus users and auto commuters would benefit from a busway, as would residents and businesses in the entire study corridor. By offering an attractive transit alternative, the busway can reduce travel demand on the congested I-84 roadway, thereby expanding the freeway's physical capacity.

Projected Ridership. The busway is projected to generate 6,690 peak period trips, more than any of the other modal alternatives (i.e. light rail and commuter rail) studied in the Hartford West MIS. As shown in Table 4.3,

Table 4.2

PROJECTED TRAVEL TIME SAVINGS - PEAK PERIOD

Hartford West MIS

Busway Performance Measures	*Current System (1995)*	*System Base Case (2020)*	*System with Busway (2020)*	*Busway Only (2020)*
Average Trip Time (minutes)	12.2	12.6	8.7	8.7
Average Trip Length (miles)	3.2	3.4	3.2	3.9
New Britain - Hartford Transit Travel Time (minutes)*	34.6	33.8	24.8	20.1
Time Savings from Busway (minutes)	—	—	9.0	13.7
Percent Savings	—	—	26.6%	40.5%

**Analysis assumes all stops for buses. In operation, through buses will average 45 mph*
Source: Technical Report #3, Hartford West Major Investment Study

Table 4.3

BUSWAY PASSENGER RIDERSHIP

Hartford West MIS

Busway Performance Measures	*Current System (1995)*	*System Base Case (2020)*	*System with Busway (2020)*	*Busway Only (2020)*
Peak Period Passenger Trips	8,380	7,360	11,630	6,690
Peak Period Passenger Miles	26,580	24,700	36,760	26,040
Average Travel Speed (MPH)	15.6	16.0	21.8	26.8

Source: Technical Report #3, Hartford West Major Investment Study

an increase of 4,270 new peak period trips by the Year 2020 was forecast for the regional transit system with the busway alternative, as compared to the 2020 Base Case. Daily ridership is also estimated to increase from 19,870 riders in the base conditions to 28,690 riders in the Recommended Package. This equates to 8,820 new riders per average weekday and an increase of 58.0% over the Base.

Issues Related to Implementation Additional issues remain to be resolved regarding this alternative:

- Negotiations with Amtrak to operate the planned services between Newington Junction and Union Station;
- The location, planning and design of fixed station locations along the busway;
- Entering and exiting points for buses along the busway;
- Bus Circulation on Downtown Streets;
- Coordination and joint development opportunities with Central Connecticut State University;
- Reevaluation of bus routes that may use all or part of the busway for service;
- Evaluation of structures along the busway to determine the need for rehabilitation or reconstruction;
- Integration with development plans in Parkville, Charter Oak, Elmwood, and other areas in Hartford and West Hartford; and
- Development of a signal system for grade crossing control.

4.3 RECONSTRUCTION OF FLATBUSH, PROSPECT, SISSON AND SIGOURNEY AVENUE INTERCHANGES (WEST SIDE ACCESS)

Reconstruction of the four interchanges are important from two perspectives. Interstate access to the west side of Hartford and areas of West Hartford will be critical to the economic vitality of this part of the Capitol region. Clearly, Interstate 84 will continue to be the dominant provider of transportation service for the next two decades handling auto, bus and truck traffic.

It will be important to Hartford and West Hartford to provide accessibility from the west to the Flatbush Avenue area to support economic redevelopment initiatives. The provision of full east-west movements from and to the freeway is important to facilitate development of area business and industry. In addition, this section of Interstate 84 consists of several left hand entrance and exit ramps, making the weaving hazard more severe especially as traffic volumes increase.

Combining these four interchange areas as a unified whole through the construction of Collector - Distributor (C-D) Roads on both sides of the Interstate will remove merging and diverging movements from the mainline. The increase in accessibility to area development and the enhanced safety of operations suggest the importance of implementing this reconstruction of Interstate 84. Further study will be undertaken to refine the interchange scheme and to complete an Environmental Assessment (EA).

4.4 RECONSTRUCTION OF ROUTES 4, 6 AND 9 INTERCHANGES

As noted in the report, this segment of the Interstate is the site of roadway congestion and is the key to accessibility in this area of the Hartford West corridor. To briefly summarize the deficiencies in this area:

- The eastbound left hand entrance ramp from Route 4 to Interstate 84 creates unsafe merging and congestion;
- Eastbound lanes on the I-84 mainline are reduced from

three to two lanes creating a choke point exacerbating congestion;
- It is not possible to move directly from eastbound Route 4 to southbound Route 9 without circulating on local roads;
- From eastbound I-84, the westbound exit on Route 4 is a left-hand exit ramp;
- From westbound I-84, the Route 6 exit does not offer a visible alternative to Route 4 in accessing southern and western areas of Farmington; and
- From the Route 6 interchange, it is not possible to move westbound on I-84.

The realignment of the eastbound lanes of I-84 and construction of a Collector - Distributor (C-D) Road along eastbound I-84 would eliminate the left hand on and off ramps and enable a direct connection from Route 4 to southbound Route 9. The proposed new interchange would also enable the development of a full interchange for Route 6 and I-84. This proposal will be advanced to the design phase. It is anticipated that a Categorical Exclusion (CE) will be granted for this study.

4.5 AUXILIARY LANES IN WEST HARTFORD.

Auxiliary lanes would be constructed between entrance and exit ramps providing an additional margin of safety in merging and exiting the Interstate. Auxiliary lanes are needed because of the continued increase in traffic brought about by development in this area of the corridor. These safety improvements between Exits 40 and 42 on I-84 are supported by the town and CRCOG to be advanced into the design phase. Because improvements will be made within existing right-of-way and impacts are limited, it is anticipated that a Categorical Exclusion (CE) will be granted for this improvement. Special sensitivity will be given to noise impacts on adjoining neighborhoods.

4.6 IMPROVED BUS SERVICES ALONG I-84/FARMINGTON AVENUE

The reconstruction of the two interchange areas and the implementation of transit services in the rail corridor will provide substantial benefits to these communities; however, other needs exist. The continued increase of traffic along the I-84/Farmington Avenue corridor will be real and will result in continued congestion and environmental degradation. The Recommended package RAP should include those components of RAP 2 (Transit Operations) that would provide enhanced transit routes and services along this area of the corridor.

New express or limited bus services could be considered:

- **Hartford-New Britain Express** - The transit hubs in downtown Hartford and New Britain would be linked via a Route 9/I-84 Express link that provide increased mobility between the two largest population concentrations in the study area and allow for connections between the independent Hartford and New Britain transit networks.
- **New Britain-Westfarms-West Hartford Limited** - The transit hubs in New Britain and West Hartford would be linked via a limited service that would operate in express mode along limited access highways but also provide pick up and distribution services near transit hubs.
- **UConn Medical Center Express** - A route connecting the University of Connecticut Health Center with Hartford via Routes 4 and I-84 would link a major employment center with Hartford, and also provide the possibilities of another park/ride facility for Farmington residents to travel to Hartford.

Local Transit service could be expanded to include:
- **UConn Medical Center - New Britain**
- **Local Farmington Bus** - A local bus serving the transit hubs at UConn and Westfarms Mall.
- **Newington-West Hartford Service** - A new route operated along the SR 173 corridor.
- **Newington-Westfarms-Farmington Service** - A route from Market Square Newington via Central Connecticut State University, Westfarms Mall, and UConn Medical Center.
- **W-Route Extension** - Extend the W-Route from Hartford to Newington to run to Downtown New Britain via East Street, Allen Street and ML King Street. This would provide access to New Britain from Northwest Newington and Downtown West Hartford.
- **Stanley Street - New Britain Ave Service** - Interline the New Britain Transit Westfarms Service with the Connecticut Transit Q Route service to Westfarms Mall to provide one seat ride for local passengers between the transit dependent neighborhoods in Hartford, Elmwood and New Britain while also providing an additional local service other than the P Route to provide for travel between Hartford and New Britain.
- **East Street Extension** - The Dattco East Street Route could be extended via Cedar Street to downtown Newington providing an additional more direct path

between the two transit hubs. This crosstown route could be further extended if desired to downtown Wethersfield via an eastward extension on Route 175.

- **E-Route Limited** - Improve the bus travel times by offering "limited" service to some passengers boarding west, north or south of LaSalle Road. The shorter Farmington Ave route variations could make every stop for which there is a demand. However, the longer E route variations, such as Unionville, the Medical Center, and Westfarms Mall would provide "limited" service, making few or no stops between West Hartford center and downtown Hartford.

The transit service improvements will be considered in the context of the statewide bus transit study being undertaken by ConnDOT and the Regional Transit Strategy undertaken by CRCOG. The ConnDOT study is actually being undertaken in two parts. One part considers the routing, scheduling, and ridership associated with existing routes and recommended modifications. The second part examines organization, management, and funding associated with bus operations. Because changes in bus routing may be implemented without major capital investment, these alternatives may be able to be implemented within a relatively short planning horizon.

4.7 SUPPORT FOR ARTERIAL ROADWAYS

Based on the previous analysis, data revealed that arterial highways would become increasingly congested if capacity improvements were not made on Interstate 84 or the New Britain Rail Line. Improvements on arterial highways are difficult because additional lanes may impact roadside property - businesses and residencies - therefore meeting community resistance. Increased congestion resulting from growing traffic volumes results in negative impacts on the communities quality of life - air quality, pedestrian movements, highway safety, and related impacts.

Hartford, West Hartford, and other municipalities experiencing these problems should seek the support in developing arterial improvements that are both responsive to transportation needs and sensitive to the concerns of communities through which the highways traverse. The intersections and park and ride lots targeted for improvement will be included as part of an overall strategy undertaken by CRCOG and CCRPA to address safety, operational, and transportation impacts on quality of life.

Locations in need of safety improvements included:

- Route 4 approaching the jug handle;
- Route 71 south of Corbins Corner;
- Route 175 from Route 9 to Route 176; and
- Interstate 84 from Sigourney St. to High St.

The intersections in need of further investigation for operational improvement include:

- Hartford Avenue at New Britain Avenue;
- New Park Avenue at Flatbush;
- Park Road at I-84 Off-Ramp;
- Park Road at I-84 On-Ramp;
- Park Road at So. Main;
- Park Road at Trout Brook;
- Rt. 173 at New Britain Avenue
- Route 4 at I-84 Ramps (Jug Handle);
- Route 4 at Old Mountain/Talcott Notch; and
- South Main Street at New Britain Avenue.

Park and Ride Lots are an important element in the transportation system because they provide a convenient location for carpooling, vanpooling, and express and local transit stops. There are opportunities for the expansion or the construction at new locations. Several of these locations include:

- Plainville - I-84 at Crooked Street (Exit 34);
- Farmington - Additional Parking at Fienemann Road (Exit 37);
- Farmington - Route 6 at I-84 (Exit 38);
- Farmington - Expand parking at Route 4 (Exit 39); and
- West Hartford - I-84 at New Britain Avenue (Exit 40).

4.8 TRANSPORTATION DEMAND MANAGEMENT

This analysis and others performed have shown that Transportation Demand Management (TDM) strategies are successful in enhancing transit use when implemented in concert with major transit improvements. Some strategies such as parking pricing and congestion pricing may meet with resistance; yet, transit financial incentives are a positive adjunct that would increase transit ridership. This TDM strategy should be implemented along with the New Britain-Hartford Busway bus operations strategies.

4.9 LAND USE REGULATION TO SUPPORT TRANSIT FRIENDLY DESIGN

The corridor communities, that have participated in the Hartford West MIS study want a new future for the Hartford West corridor. Almost without exception they have sought transportation investments that do not rely on the single occupant vehicle for success. They have

asked ConnDOT and CRCOG to make investments that encourage alternative forms of transportation whether light rail, commuter rail, or busway.

To succeed, Hartford, Farmington, West Hartford, Newington, and New Britain must enact land use plans and regulations that encourage transit supportive development. Some of the critical elements of such a plan would include:

- Providing incentives for high density development along transit corridors (e.g. New Britain Busway);
- Requiring new development support for transit services just as development support off-site roadway improvements;
- Enacting site planning requirements that limit parking and encourage transit use;
- Require transit stops and pedestrian accessibility for all new developments;
- Coordination of transit feeder/distribution with new high volume services such as busways;
- Cessation of construction of parking garages and capacity as an answer to urban development; and
- Limitations on continued auto dependent suburban development of office and industrial sites applying the same requirements for transit service and accessibility as in the urban core.

4.10 EFFECT ON HIGHWAY PERFORMANCE

Several factors contribute to improved freeway and arterial operations under the Recommended RAP scenario. First, the busway creates a modal shift from automobiles to transit, which reduces the number of vehicles within transportation system. In addition to the busway, the reconstruction of the Routes 4/6/9 and the Prospect/Flatbush/Sisson/Sigourney interchanges improves the operations of the mainline freeway lanes by removing conflicting entering and exiting traffic to specially designed Collector-Distributor (C-D) roads. The increase in average speed for the freeway after these improvements are made is projected to increase from 38 to 43 mph in the A.M. Peak and from 34 to 41 mph in the P.M. Peak.

In both peak period analysis periods, the freeway VMT decreases due to vehicles using the C/D road to access network arterial roads rather than using the freeway to complete their trip. This also causes VHT to decrease since traffic is less congested and is not waiting in delay. The overall result is an increase in average speed and improved Levels of Service. Table 4.4 gives a detailed breakdown of the Recommended RAP performance measure of effectiveness. Figures 4.3 and 4.4 graphically depict the Levels of Service as measured by lane density for both eastbound and westbound I-84 for both the A.M. and P.M. Peak Periods.

Arterial Operations

As the ability of the freeway to handle greater volumes is enhanced, the traffic burden placed on the arterial roads is reduced. Also, the shift of modes of transportation from automobile to bus transit contributes to congestion reduction on the arterial system. As noted in Table 4.5, the total miles of congestion as measured by volume to capacity ratios (V/C) greater than 1.00 is reduced. The mileage reduction in the A.M. Peak is 2.97 while the reduction in the P.M. Peak is 5.29. The changes in V/C ratio ranges for each of the network arterial are graphically illustrated in Figures 4.5 and 4.6.

4.11 CAPITAL & OPERATING COSTS

The Recommended Package is estimated to have a total cost of approximately $230 million dollars, including right-of-way, engineering, and construction. Of the various all of the recommendations, the reconstruction of I-84 in the vicinity of the Flatbush Avenue interchange is the most expensive due to the addition of the C-D road and its associated structures cost. The second most expensive element is the construction of the New Britain-Hartford Busway at $75.3 million. Table 4.6 lists the costs for each of the improvement elements of the Recommended Package.

Operating Costs & Subsidies. In addition to the costs associated with the construction and maintenance of the new improvements, there are additional costs to consider when implementing a transit service. Transit subsidy, or money spent by a public agency to partially fund the operation of the service, must be considered by policy makers in the decision to adopt a new transit service. This transit subsidy is not a one time cost, but rather an annual cost that is required to offset the cost of operating the service after fare box revenues are included. Based on data provided by CTTransit, the State of Connecticut currently pays about $7.7 million dollars a year subsidy on the existing fixed route transit services in the corridor. This equates to roughly $1.33 per person per trip. If the decision is made to build a dedicated busway as part of the Recommended Package of Improvements, an additional $5.7 million dollars per year would be necessary to support the new service.

CRCOG is currently developing a Regional Transit Strategy (RTS) that will provide a blue print for the future of public transit in the region. Among other topics the RTS will provide an approach by which additional financial resources for operating costs will be made available to innovative transit operations such as the New Britain-Hartford Busway.

Table 4.6

CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS

Hartford West MIS

Recommended Improvements	Millions of Dollars
New Britain-Hartford Busway	$75.3
Reconstruction of Flatbush, Prospect, Sisson and Sigourney Avenue Interchanges (West Side Access)	$102.3
Reconstruction of Routes 4, 6 and 9 Interchanges	$37.7
Auxiliary Lanes on I-84	$3.6
Improved Bus Services along I-84 / Farmington Avenue	Unknown
Support for Arterial Highways (TSM Improvements)	$10.8
Transportation Demand Management - Transit Financial Incentives (Annual Expense)	$3.0
Land Use Regulation to Support Transit Friendly Design (Local Costs)	Unknown
TOTAL COST	**$232.7**